

# Installation Instructions

## COPY

### 234

Series D  
and Series E

## GAS-FIRED WATER OR STEAM BOILER

## bryant

## REMOVE

Cancels: 39234D23

39234D24  
7/15/73

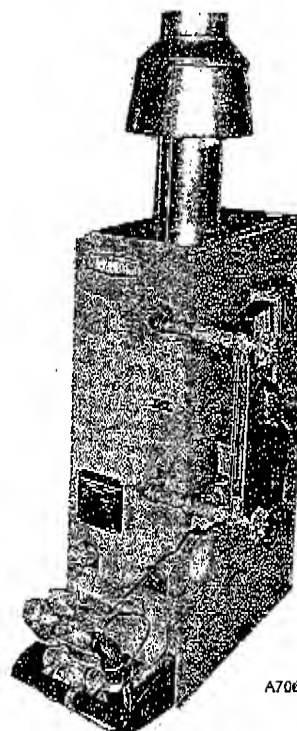
NOTE: THESE  
INSTRUCTIONS  
MUST BE LEFT  
ON OR NEAR  
THE BOILER.

The Model 234 is a low-pressure, sectional, cast-iron water and steam boiler. The design is certified by A.G.A. for use with natural and propane gases. It is tested for a maximum working pressure of 100 psi on water and 15 psi on steam in accordance with ASME standards for cast-iron boilers.

The boiler is available as a Type GW - Gravity, Type PW - Circulation Pump, Type CW - Coil Circulation Pump, and Type S - Steam. All boilers are factory assembled.

All installations are subject to codes established by local utilities or other authorities having jurisdiction. This jurisdiction normally covers electrical wiring, gas piping, flue specification, and insulation of adjacent combustible material where required clearances cannot be maintained. As a practical guide, use the American National Standard Installation of Gas Appliances and Piping Z21.30, and Bryant Form No. 39003D1 "Procedure for Gas Appliances".

Read these instructions completely before beginning the installation.



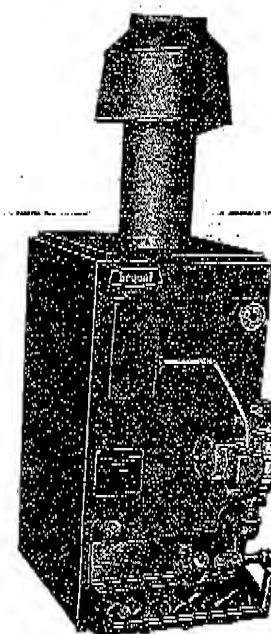
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Figure 1

### TABLE I — GAS CONTROL OPTIONS

Control Type	Gas Type	Boiler Type	Control Components
D2 100% shutoff 24 Volt Thermocouple pilot	Propane	PW & S	100% In-line shutoff Thermocouple pilot Transformer Bryant diaphragm gas valve
D4 Non 100% shutoff 24 Volt Bryant pilot	Natural	PW, GW, CW, & S	Bryant automatic pilot Bryant automatic gas valve Gas pressure regulator Transformer
D5 100% shutoff 24 Volt Thermocouple pilot	Natural	PW, GW, CW, & S	100% pilot line shutoff valve Thermocouple pilot Transformer Gas pressure regulator Bryant automatic gas valve
D6 100% shutoff Millivolt Thermocouple pilot	Natural	PW, GW, & S	Self-generating thermocouple pilot Automatic gas valve Gas pressure regulator



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Figure 2

TABLE II — RATINGS AND CAPACITIES

Boiler Size	Type	A.G.A. RATINGS								Boiler Water Capacity in Gallons	Approx Shipping Weight		
		Gross Input Btuh		Gross Output				Net Output					
		Natural	Propane	Natural Btuh	Sq Ft	Propane Btuh	Sq Ft	Natural Btuh**	Sq Ft	Propane Btuh**	Sq Ft		
3	PW	90,000	85,000	72,000	480	88,000	453	62,600	417	59,100	393	5.0	310
4	PW	125,000	110,000	100,000	667	88,000	587	87,000	580	76,500	510	6.5	380
5	PW	160,000	150,000	128,000	853	120,000	800	111,300	743	104,300	697	8.0	435
6	PW	200,000	175,000	160,000	1067	140,000	933	139,100	927	121,700	811	9.3	505
7	PW	240,000	220,000	192,000	1280	176,000	1173	167,000	1113	153,000	1020	11.0	570
3	GW	90,000	85,000	72,000	480	88,000	453	62,600	417	59,100	393	5.0	285
4	GW	125,000	110,000	100,000	667	88,000	587	87,000	580	76,500	510	6.5	355
5	GW	160,000	150,000	128,000	853	120,000	800	111,300	743	104,300	697	8.0	410
6	GW	200,000	175,000	160,000	1067	140,000	933	139,100	927	121,700	811	9.3	480
7	GW	240,000	220,000	192,000	1280	176,000	1173	167,000	1113	153,000	1020	11.0	540
4	CW	138,000	130,000	110,400	736	104,000	695	96,000	640	90,400	603	9.2	450
5	CW	160,000	160,000	128,000	853	128,000	853	111,300	743	111,300	743	10.6	505
6	CW	200,000	200,000	160,000	1067	160,000	1067	139,100	927	139,100	927	12.2	575
3	S	70,000	65,000	56,000	234	52,000	217	42,000	175	39,000	162	—	310
4	S	105,000	97,500	84,000	350	78,000	325	63,000	263	58,500	242	—	380
5	S	140,000	130,000	112,000	467	104,000	433	84,000	350	78,000	325	—	440
6	S	175,000	162,500	140,000	583	130,000	543	105,000	438	97,500	405	—	510
7	S	210,000	195,000	168,000	700	156,000	650	126,000	525	117,000	487	—	570

\*Ratings are for altitudes to 2000 feet for natural and propane gases. Ratings for units for altitudes over 2000 feet are 4% less for each 1000 feet above sea level. Ratings in square feet are computed at 150 Btuh/Sq Ft for water boilers and 240 Btuh/Sq Ft for steam boilers.

\*\*Selection Factors providing for piping loss and starting load are those recommended by the Institute of Boiler and Radiator Manufacturers. Net water boiler ratings are based on an allowance of 1.15. For steam boiler ratings and water boiler jobs having a high pipe loss and pick-up requirements, use a factor of 1.333.

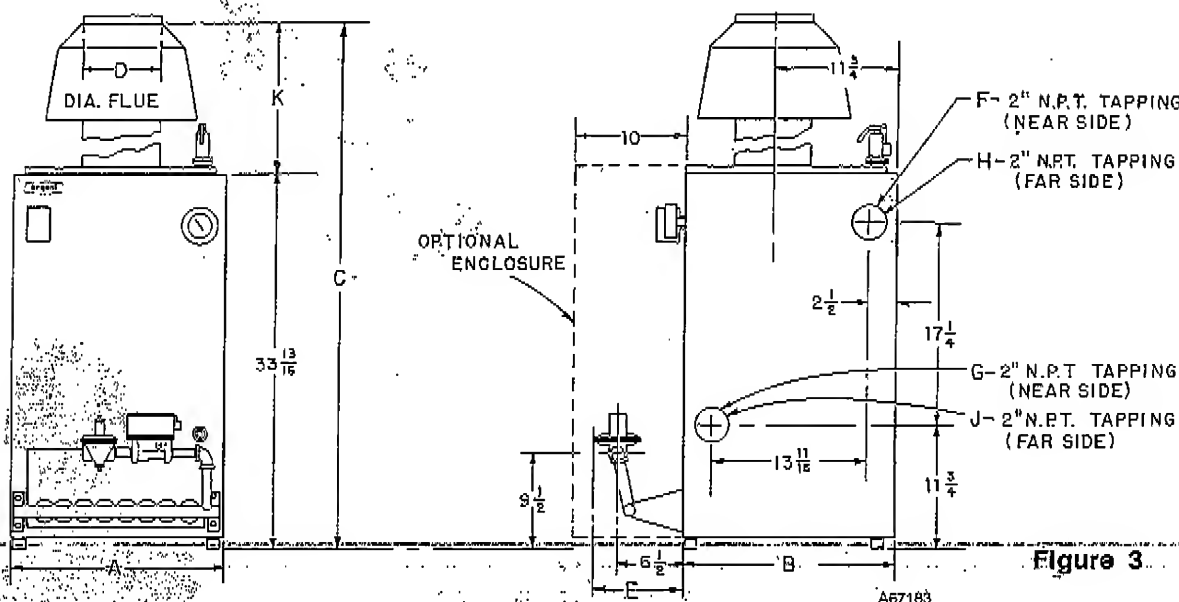


Figure 3

TABLE III — DIMENSIONS

Model Size & Type	A	B	C	D	E	F	G	H	J	K	Gas Inlet Size		
											Natural		
											D4 & D5	D6	
234-3GW	9-3/4	18-5/8	47-9/16	5	8-3/8	open	open	plugged	plugged	13-3/4	1/2	1/2	
234-4GW	12-5/8	18-5/8	47-9/16	5	8-3/8	open	open	plugged	plugged	13-3/4	1/2	1/2	
234-5GW	15-1/2	18-5/8	51-9/16	6	8-3/8	plugged	open	open	plugged	17-3/4	1/2	1/2	
234-6GW	18-3/8	18-5/8	54-5/16	7	8-3/8	plugged	open	open	plugged	20-1/2	1/2	3/4	
234-7GW	21-1/4	18-5/8	54-5/16	7	8-3/4	plugged	open	open	plugged	20-1/2	1/2	3/4	

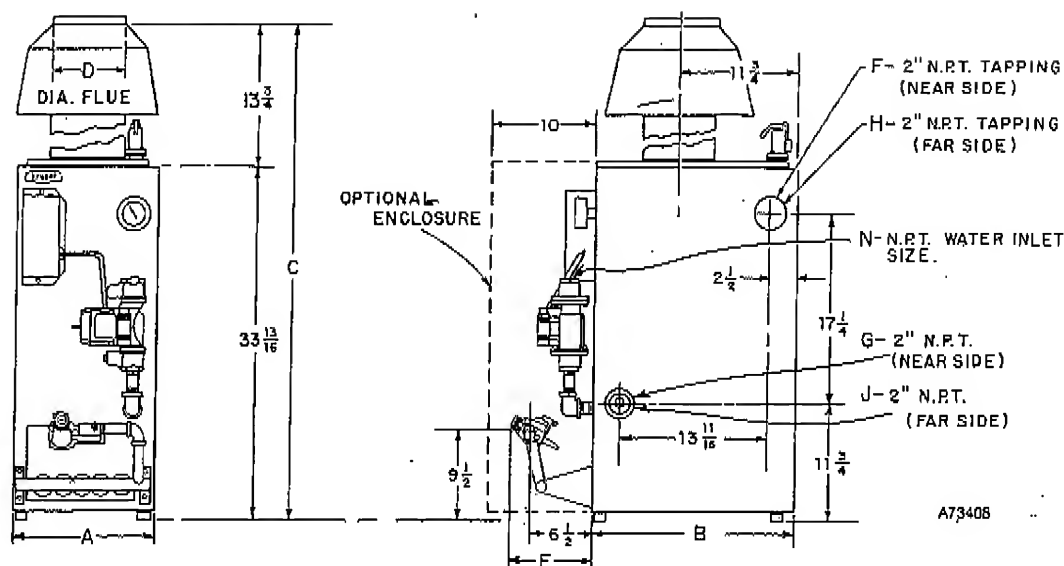


Figure 4

TABLE IV — DIMENSIONS

Model Size & Type	A	B	C	D	E	F	G	H	J	N	Gas Inlet Size		
											Natural		Propane
											D4 & D5	D6	D2
234-3PW	9-3/4	18-5/8	47-9/16	5	8-3/8	plugged	plugged	open	plugged	1	1/2	1/2	1/2
234-4PW	12-5/8	18-5/8	47-9/16	5	8-3/8	plugged	plugged	open	plugged	1	1/2	1/2	1/2

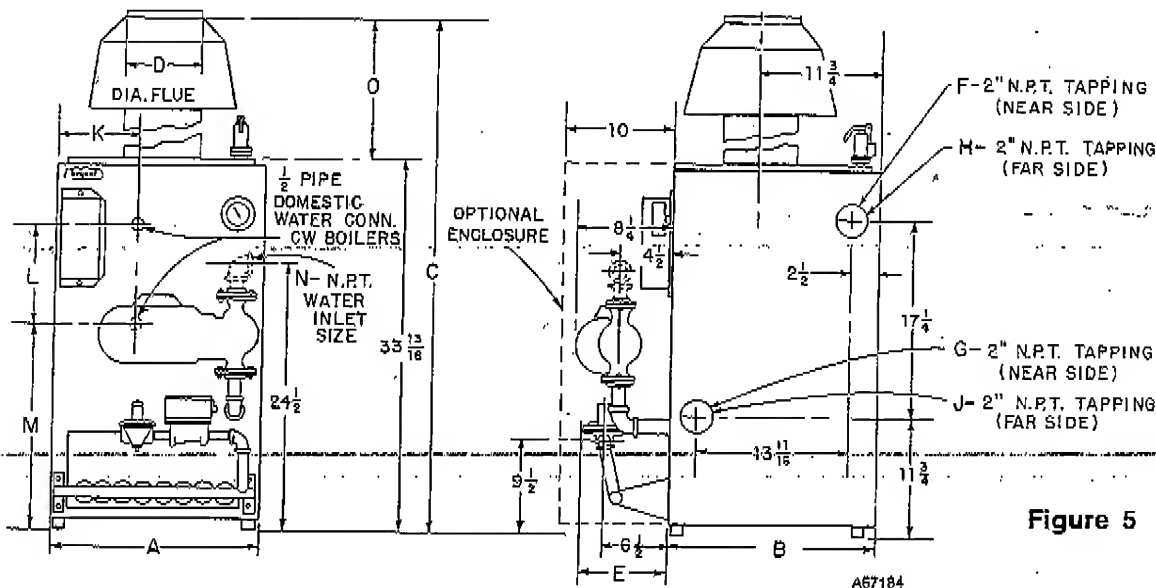


Figure 5

TABLE V—DIMENSIONS

Model Size & Type	A	B	C	D	E	F	G	H	J	K	L	M	N	O	Gas Inlet Size		
															Natural		Propane
															D4 & D5	D6	D2
234-5PW	15-1/2	18-5/8	51-9/16	6	8-3/8	plugged	plugged	open	plugged	—	—	—	1-1/4	17-3/4	1/2	1/2	1/2
234-6PW	18-3/8	18-5/8	54-5/16	7	8-3/8	plugged	plugged	open	plugged	—	—	—	1-1/4	20-1/2	1/2	3/4	1/2
234-7PW	21-1/4	18-5/8	54-5/16	7	8-3/4	plugged	plugged	open	plugged	—	—	—	1-1/2	20-1/2	1/2	3/4	1/2
234-4CW	15-1/2	18-5/8	51-9/16	6	8-3/8	plugged	plugged	open	plugged	7-1/2	9	18	1-1/4	17-3/4	1/2	—	—
234-5CW	18-3/8	18-5/8	54-5/16	7	8-3/8	plugged	plugged	open	plugged	7-1/2	9	19	1-1/4	20-1/2	1/2	—	—
234-6CW	21-1/4	18-5/8	54-5/16	7	8-3/8	plugged	plugged	open	plugged	10-3/8	9	19	1-1/2	20-1/2	1/2	—	—

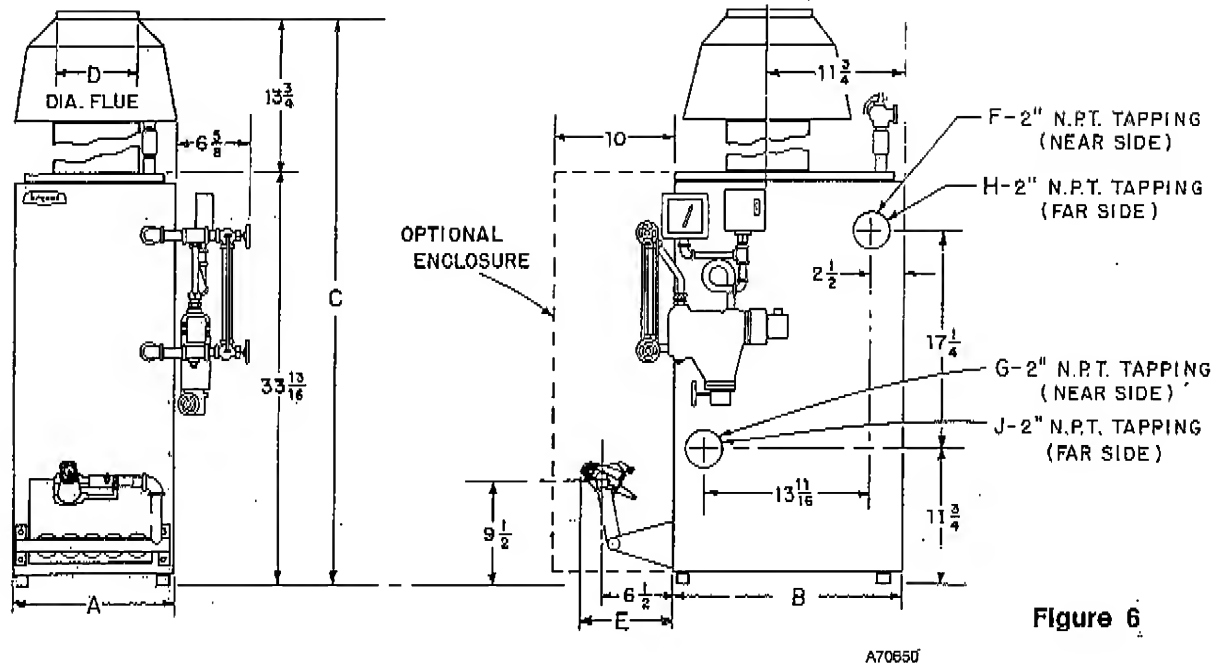


Figure 6

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TABLE VI — DIMENSIONS

Model Size & Type	A	B	C	D	E	F	G	H	J	Gas Inlet Size		
										Natural	Propane	
										D4 & D5	D6	D2
234-3S	9-3/4	18-5/8	47-9/16	5	8-3/8	open	open	open	open	1/2	1/2	1/2
234-4S	12-5/8	18-5/8	47-9/16	5	8-3/8	open	open	open	open	1/2	1/2	1/2

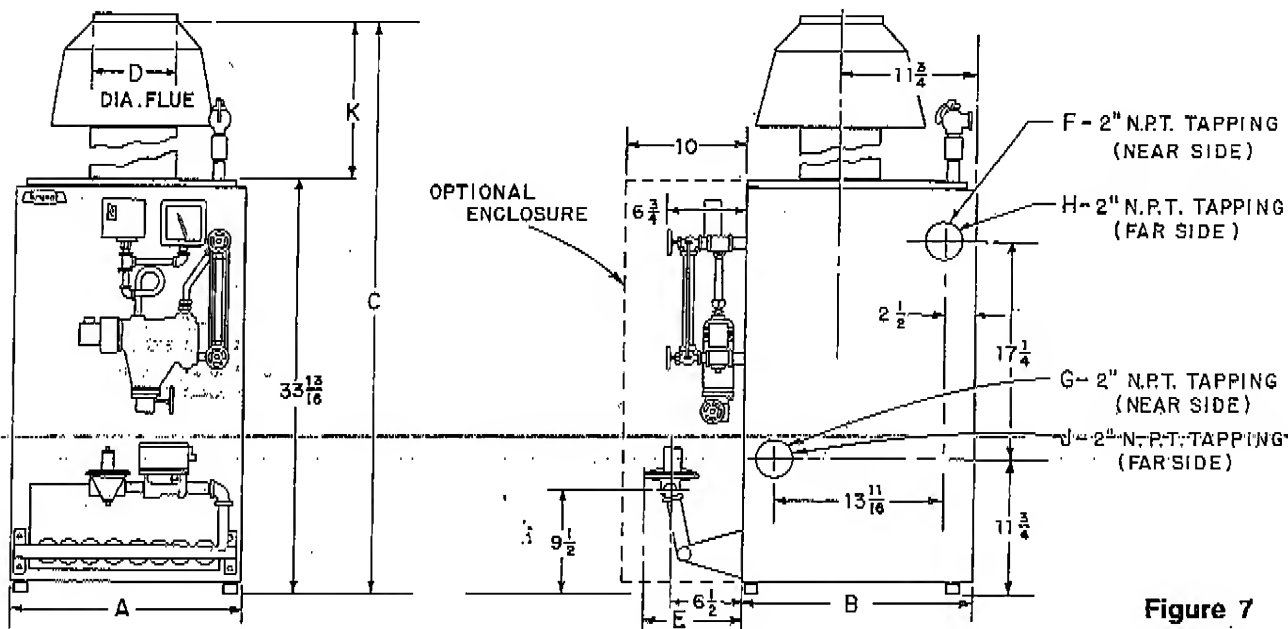


Figure 7

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TABLE VII — DIMENSIONS

Model Size & Type	A	B	C	D	E	F	G	H	J	K	Gas Inlet Size		
											Natural	Propane	
											D4 & D5	D6	D2
234-5S	15-1/2	18-5/8	51-9/16	6	8-3/8	open	open	open	open	17-3/4	1/2	1/2	1/2
234-6S	18-3/8	18-5/8	54-5/16	7	8-3/8	open	open	open	open	20-1/2	1/2	3/4	1/2
234-7S	21-1/4	18-5/8	54-5/16	7	8-3/4	open	open	open	open	20-1/2	1/2	3/4	1/2

## LOCATING THE UNIT

Consult local building codes or ordinances that may apply.

1. Boiler should be installed on level foundation. Metal shims may be used to level if required. Locate boiler near gas vent or chimney.
2. Combustible Floors - When boiler is installed on combustible floor, it is necessary to insulate floor. Bryant supplies, as optional equipment, a combustible floor installation kit. This kit contains a rectangular plate of galvanized steel with matching piece of insulating material. Fasten insulation and steel plate to combustible floor and place boiler on top of steel plate.
3. Maintain at least 6 inches from combustible material on all sides.
4. Leave enough room for service access. Consult local approval agency; some require a minimum of 24 inches for service access.
5. When unit is installed in small room, or building of relatively airtight construction, provide air for combustion and ventilation. This air must be supplied through two openings of equal area, one located above draft diverter relief opening and other near floor. Total free area of each opening should be equal to 1 square inch for each 1,000 Btu/h of boiler input. There should be a minimum of 100 square inches for each opening. If air openings are directly to outdoors, minimum free area should be 1 square inch per 2,000 Btu per hour of input rating, or in accordance with ANSI Z21.30 or the latest edition of "American National Standards for Installation of Gas Appliances and Gas Piping."
6. Advise owner of necessity for keeping air passages to boiler area free of obstructions. This clearance is necessary so combustion air can enter freely into combustion chamber. It is also necessary to provide adequate ventilating air.

## FLUE CONNECTIONS

Make sure draft hood furnished with boiler is installed without modifications. The following is standard practice for installing flue pipe. In addition, consult local codes and gas company requirements.

1. Flue pipe must be of same size as outlet collar on draft hood.
2. Flue pipe must slope upward from boiler to chimney. Minimum slope is 1/4 inch upward per linear foot of flue pipe.
3. Run pipe as directly as possible with minimum number of turns.
4. Do not connect into chimney serving open fireplace.
5. End of flue pipe must be flush with inner face of chimney liner.
6. Rigidly support pipe with hangers and straps.
7. Chimneys should extend at least 2 feet above any object within radius of 15 feet.

8. All flue pipe extended through roof should be equipped with hood.

9. Boiler may be installed with either galvanized Type C vent or listed Type B vent, at option of installer. Where Type C flue or vent connector is used, it shall have clearance of 6 inches between its surface and any combustible material. If Type B flue or vent connector is used, clearance from its surface to any combustible material shall be in accordance with its listing. Consult local codes to insure correctness.

10. Where two or more appliances vent into a common flue, area of common flue should at least equal area of largest flue or vent connector plus 50% of areas of additional flues or vent connectors.

## GAS SUPPLY LINE

Comply with applicable codes and regulations.

It is good practice to run separate gas line directly to gas meter for supplying central heating boilers. Line should be at least as large as manual gas shutoff supplied. If calculated pressure drop exceeds 0.3 inches water, line should be run at least one size larger than usual gas shutoff. In no case should the drop exceed 0.3 inches water.

Pipe should be supported with adequate straps or pipe hangers. Provide drip leg at bottom of supply riser. Drip leg may extend down to floor to help support weight of gas supply line. Install ground joint union between riser or drip leg and boiler controls. See Figure 8.

Joint compound (pipe dope) that is resistant to action of propane should be applied sparingly and only to male threads of joints. Consult local supplier for type of compound to be used.

Manual gas shutoff valve should be approximately 5 feet above floor. Install valve so that 1/8 inch tapping used to connect pilot gas supply line is located on inlet (supply) side.

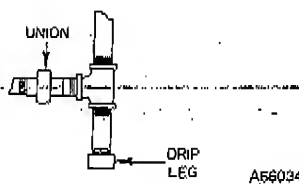


Figure 8

**NOTE:** For propane installations, the main manual shutoff valve is an integral part of the 100% shutoff safety control mounted on manifold with the electric gas control valve. Units with controls enclosure must have a manual main shutoff valve external to the jacket where regulations require.

**WARNING:** Never use a match for either open flame to check for gas leaks. All gas connections have been made and checked for leaks. The supply lines must be purged to eliminate trapped air.

## ELECTRICAL CONNECTIONS

All electrical connections are to be made in accordance with the National Electric Code and local codes governing such wiring. Field connections are to be made in accordance with the wiring label attached to the boiler. These labels are reproduced in this manual.

If any of the original wire as supplied with the unit must be replaced, use type 105°C thermoplastic wire or its equivalent.

## WATER LINE CONNECTIONS

On 234-PW-type boilers, the water outlet must be made on the right side if the pump is mounted on the side. For 234-PW-type boilers with the pump mounted in front, the water outlet must be made on the left side. Before attempting any changes, consult Bryant Air Conditioning Company.

## BOILER WITH REFRIGERATION SYSTEM

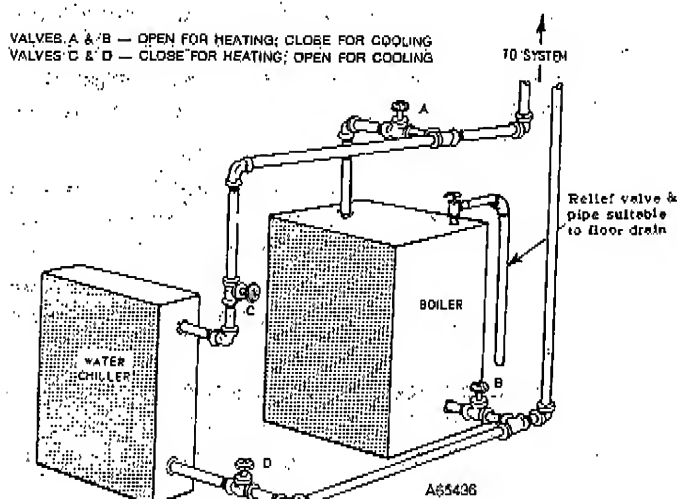


Figure 9

When a water boiler is used in connection with a chilled-water system, it must be installed so that the chilled medium is piped in parallel with the heating boiler with appropriate valves to prevent the chilled medium from entering the heating boiler. An example of such piping is shown above.

When the boiler is connected to heating coils located in air handling units where they may be exposed to refrigerated air circulation, the boiler piping system must be equipped with flow control valves or other automatic means to prevent gravity circulation of the boiler water during the cooling cycle.

## START-UP AND ADJUSTMENT

Check to be sure that all connections have been made. Before attempting any operation, fill the system with water. For steam boilers, fill to the water line. Never light a burner under an empty boiler. After filling system with water, bleed all air from the radiators. Add water and bleed again. Repeat as necessary until system is free of air. Open any valves in the system supply and return lines.

**NOTE:** On natural gas units equipped with Model A-643 gas valves, there are three positions for the manual valve knob, (OFF-PILOT-ON). There is a positive stop at the PILOT position. To move the manual valve knob from the PILOT position to either ON or OFF position, the manual knob must be depressed.

To adjust pilot flame on units equipped with a Model A-643 valve, the adjustment screw is located in the pilot outlet portion of the valve body. Remove the capscrew, make the necessary adjustment, and replace the capscrew.

1. If gas supply line was not purged prior to connecting boiler, it will be full of air. Since it would take a long time to vent this air through the small pilot port, it is recommended that pilot supply line be disconnected and be allowed to purge until odor of gas is detected. Never purge gas lines into the combustion chamber. Immediately upon detection of gas odor, reconnect pilot supply tube. Allow 5 minutes to elapse and light pilot in accordance with instructions on lighting plate.

2. Pilot flame should be soft blue in color.

- a. For natural gas controls (D4), flame should be of sufficient length to provide good impingement on monometal of Bryant pilot. Flame should extend upward between carry-over ports of two adjacent burners. Pilot flame should not touch boiler section.

- b. For D2, D5, and D6 gas controls, flame should surround tip of thermocouple element of pilot and extend downward to include 3/8 to 1/2 inch of thermocouple. Flame must never come in contact with any other part of thermocouple or its lead wire. Flame lies under carry-over ports of burners and merges with carry-over flames. Pilot flame should not touch boiler section.

3. If pilot flame does not have appearance described above, it may be adjusted by means of manual pilot shutoff valve. (On units not equipped with A-643 gas valve).

- a. The valve is equipped with an adjustable screw. Turn handle to "full open" position and remove screw cap to expose adjustable screw. Turn adjusting screw until flame has desired appearance.

- b. Replace screw cap.

Light main burners using procedure outlined on metal lighting instruction plate attached to unit.

Adjust gas rate for natural gas. Input should be checked at the meter to make sure that it corresponds with that shown on the rating plate attached to the unit. Follow the steps given for checking input in installation instructions for gas appliances packed with the unit.

1. Remove 1/8-inch plug in manifold downstream from gas valve and connect manometer to observe manifold pressure.

2. Set thermostat to call for heat. Be sure all other

gas-using appliances are turned off during this period of adjustment.

3. Observe manifold pressure. It should be adjusted to read 3 inches  $\pm$  0.3 inch wc. Adjustment of pressure is accomplished by means of adjusting screw in gas pressure regulator stem. (This screw is concealed under regulator sealing cap.) Turn screw clockwise to increase pressure and counterclockwise to decrease pressure.

Small changes in input can be made by changing the manifold pressure as previously described. However, the manifold pressure should not vary more than 0.3 inches wc from the rated pressure of 3 inches wc.

Further change in gas rate can be accomplished if necessary by changing the fixed orifice to the burners.

**CAUTION:** Do not under any circumstances modify orifice.

**Propane Gas:** Propane gas units are not equipped with gas pressure regulators. Burner orifices are sized to give the rated input at a manifold pressure of 11 inches wc. The only check for rated input is the manifold pressure.

### BURNER ADJUSTMENT

**Primary Air:** After the unit has been operating continuously for approximately 5 minutes, adjust each burner by closing the air shutter until a slight yellow tip appears on the flames and then open air shutters just enough to clear the yellow from the flames.

### CHECK CONTROLS

**Bryant Gas Control Valve:** If not already checked when lighting the main burner, check the proper operation of this valve. Move the thermostat to a "call for heat" position. Observe there will be a delay before the valve opens. Move the thermostat to a "satisfied" position; again, there will be a delay before the valve closes.

**AUTOMATIC PILOT:** To check the pilot operation, follow the instructions below:

Attach a low-voltage test light to electrical leads of gas valve. With thermostat set above room temperature, shut off gas supply to burners and pilot, with main manual shutoff valve. If test light goes out within 45 seconds, pilot is functioning properly. If light does not go out within 60 seconds, replace pilot.

### PILOTS WITH THERMOCOUPLE ELEMENT

The D2 and D5 gas controls have pilots equipped with thermocouple elements.

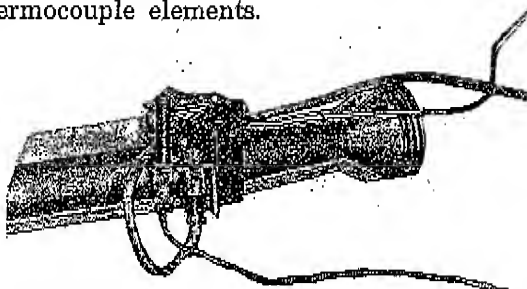


Figure 10

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The pilot flame should surround the tip the thermocouple. It should also extend downward to include 3/8 to 1/2 inch of the thermocouple tip. The flame must not come in contact with any other part of the thermocouple.

The thermocouple transforms heat energy from the pilot flame into electrical energy. The current thus generated is sufficient to operate the 100% shutoff valve. The Bryant automatic gas control valve is powered externally from the transformer, and operates independently of the shutoff valve. When there is a pilot flame, the current generated from the thermocouple holds the 100% shutoff valve in the open position and the gas control valve controls the flow of gas. Should the pilot go out, there will be no current generated by the thermocouple and the 100% shutoff valve will close and no gas can flow to the pilot.

If the pilot should go out, the electrical circuit to the main gas valve will be broken and gas cannot flow through the valve.

### BRYANT AUTOMATIC PILOT (D4)

The pilot assembly includes a normally open switch wired in series with the Bryant automatic gas control valve. The switch is at the free end of the monometal element, assembled so that the fixed end is positioned at the pilot flame. Heat applied to the fixed end of the monometal element causes the free end to move. This closes the switch and completes the electrical circuit to the gas valve. The circuit will close within 1 minute. It will remain closed as long as there is nor-

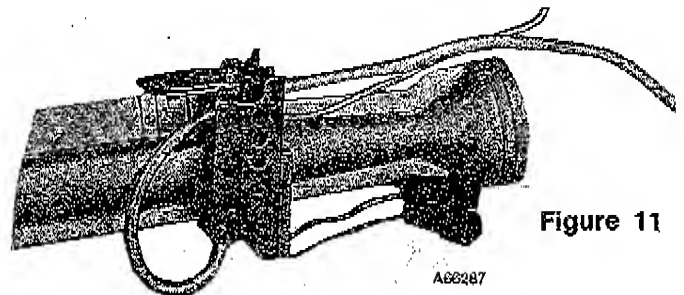


Figure 11

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mal pilot flame. While closed, the boiler is under the direct automatic control of the room thermostat or other operating control as long as the main gas manual shutoff valve is open. If the pilot flame goes out for any reason, the monometal element will cool and the free end will move back to its original position. This breaks the electric circuit and the Bryant automatic gas control valve will close. This shuts off the gas supply to the main burner.

### GAS PRESSURE REGULATOR

The gas pressure regulator, provided with all units except those using propane, is of the adjustable spring loaded type. It functions to give a constant gas pressure to the burners during all main line gas pressure fluctuations. This regulator is factory adjusted to produce 3 inches manifold pressure. On the Model A-643 gas valve, the regulator is an integral part of the valve.

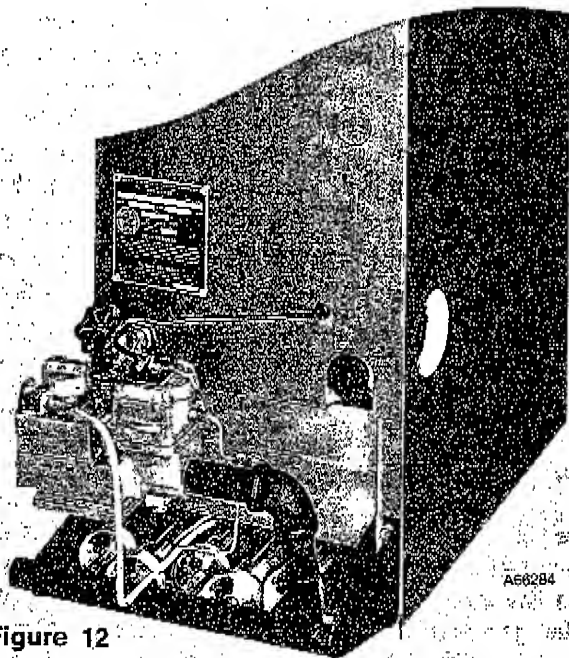
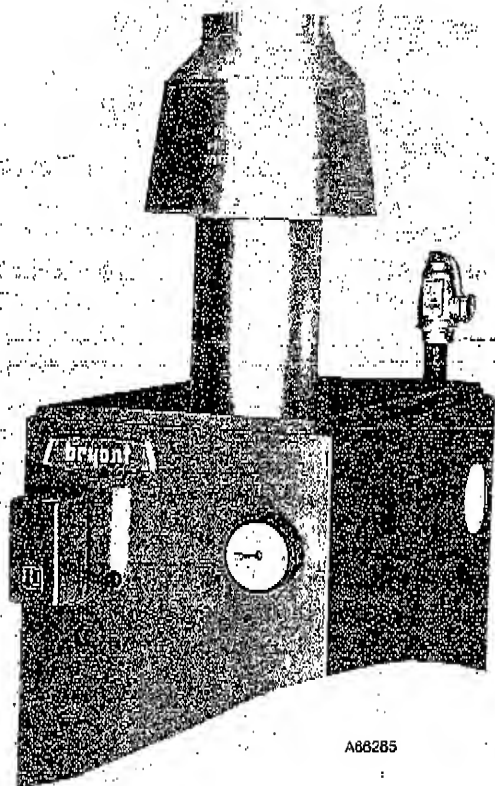


**D6 CONTROLS - SELF-GENERATING**

The D6-Control system consists of a powerpile thermocouple, a pilot head, and a combination valve.

The powerpile thermocouple transforms the heat energy of the pilot flame into electrical energy that operates the controls.

Should the pilot flame not be positioned correctly on the powerpile thermocouple or the pilot flame be out, there will be no heat energy, hence no electrical energy can be generated.

**Figure 12****Figure 13****HIGH-TEMPERATURE LIMIT****(Water Boilers Only)**

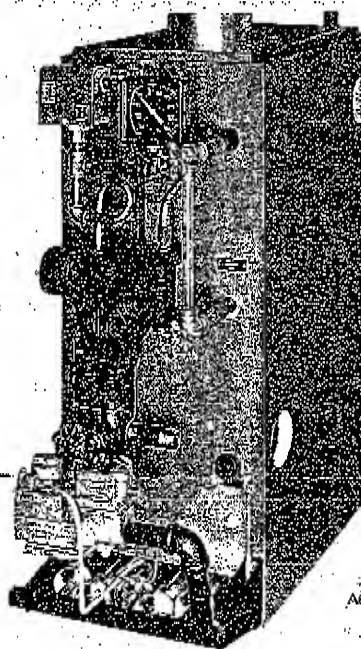
The high-temperature limit switch is a normally closed switch that opens on temperature rise. This limit has a cutout set at 240°F and an adjustable range from 180 to 240°F. When the water temperature reaches the cutout setting, the circuit to the gas valve is broken and the gas valve closes.

**PRESSURE LIMIT CONTROL****(Steam Boilers Only)**

This control will shut off the gas supply to the burners if the steam pressure in the boiler reaches the "cutout" setting. It will also permit gas flow to the burners when the steam pressure drops to the "cut-in" setting. The range between these two settings is called the "differential". The cutout pressure is equal to the cut-in pressure setting plus the differential.

**LOW-WATER CUTOFF****(Steam Boilers Only)**

This control operates to shut off the gas supply to the burner in the event that the water line in the boiler drops to a low level. It also permits gas flow to the burners when sufficient water is added to the boiler, either by opening a water valve manually or by an electric water feeder.

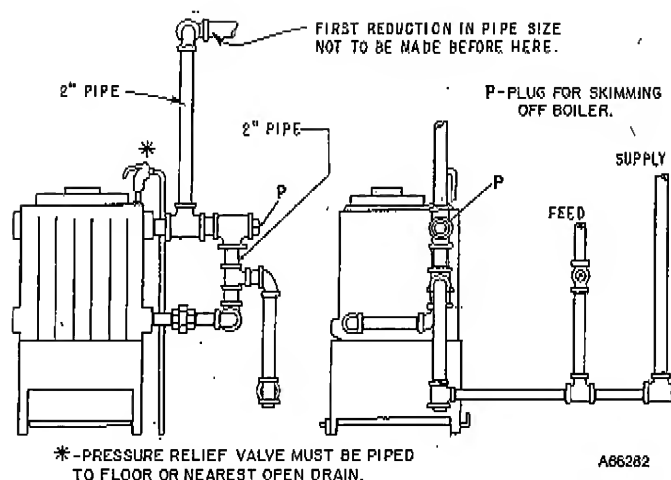
**Figure 14****CLEANING STEAM BOILERS**

**CAUTION:** The boiler should not be cleaned while it is under pressure. Drain the steam out before cleaning.

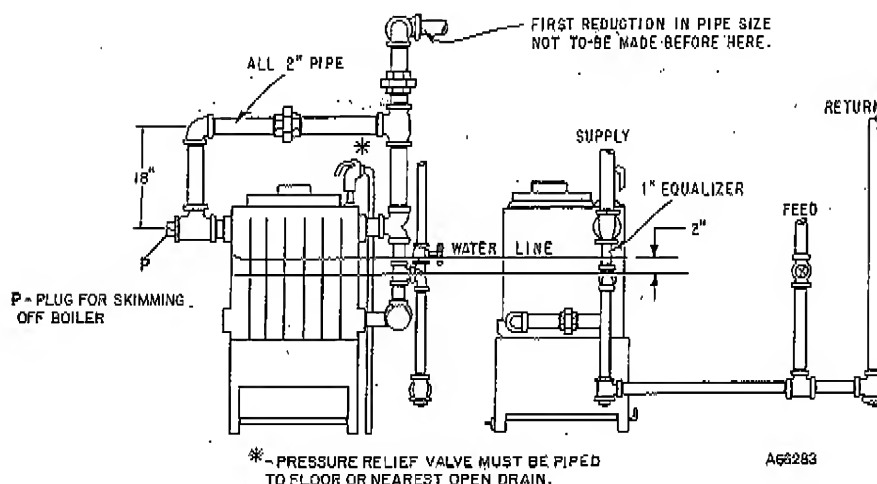
**Skimming off Impurities**

Some of the impurities in the boiler water will float on the water and must be skimmed off. Run a temporary connection from the skimmer tee.





**Figure 15** — Recommended steam header proportions for 3S, 4S, and 5S boilers. Under no circumstances should the risers be reduced in size before the first horizontal run.



**Figure 16** — Recommended steam header proportions for 6S and 7S boilers. Under no circumstances should the risers be reduced in size before the first horizontal run.

With the boiler empty and cool, slowly begin to add water. After water has entered boiler never before turn "on" main gas burners and adjust flame at main manual shutoff valve so that the water being added is kept just below boiling point. Avoid boiling and turbulence.

Gradually raise hot water level to tee, being careful not to raise it above the opening in the tee. Skim until there is no trace of impurities. Repeat process if necessary.

Water may be checked to make sure it is free from oil by drawing off a sample at the skimming tee. If the sample is reasonably free from oil, it will not froth when boiled on a stove. This test does not indicate the amount of sediment that may be in the bottom of the boiler. It is therefore necessary that the boiler be further cleaned by "blowing down".

#### "Blowing Down" Boiler

Before blowing down the boiler, fill it to the water line. Light burners and allow 5 pounds of steam pressure to build up. Run a temporary connection from one of the drain valves to a nearby sewer. Connect to a drain valve on the opposite end of the boiler from the feed water inlet, if possible. Shut off the gas burners, open drain valve, and blow-down entire contents of boiler.

Allow boiler to thoroughly cool and slowly refill to water line. Repeat as many times as required until blow-off water is clear.

#### Using Cleaning Compound

If an exceptional amount of dirt or sludge seems to be present in the boiler, a boiler cleaning compound made by a reputable manufacturer may be used ac-

cording to the instructions of the manufacturer of the compound. When any type of cleaning compound is used, care must be taken to thoroughly flush all traces of the compound out of the boiler.

Sal Soda (washing soda) is sometimes used for exceptionally dirty boilers, but its use requires extreme caution. The boiler can be seriously harmed if the soda is not thoroughly washed out or at least sufficiently so that the water does not exceed the pH value of 7 to 8. Soda is difficult to remove and requires a lengthy process of repeatedly flushing the boiler to assure complete removal.

If soda is insisted upon, it is recommended that a solution of 1 pound dissolved in a pail of hot water be prepared for each 10 gallons of boiler water. (Check water capacity of boiler). Pour the solution in any convenient opening at, or above, the flow tapping. Fill boiler to flow tapping and adjust fire manually to maintain simmering for 5 or 6 hours. Increase fire to build up 5 pounds pressure and blow-down boiler.

Blow-down boiler again, then flush continuously until it is certain that boiler is free of the soda. After the boiler has been thoroughly cleaned, add fresh, clear water to the proper level in the heating system. If the degree of acidity or alkalinity of the water must be adjusted, it is recommended that the water be mildly alkaline, not exceeding a pH value of 7 to 8.

### CARE AND MAINTENANCE

**Flue Passages:** Flue passages between sections should be examined yearly and cleaned as required.

**Boiler Controls:** Check all boiler controls for proper operation at the start of each heating season. If boiler is operated year-round, check controls at least every 6 months.

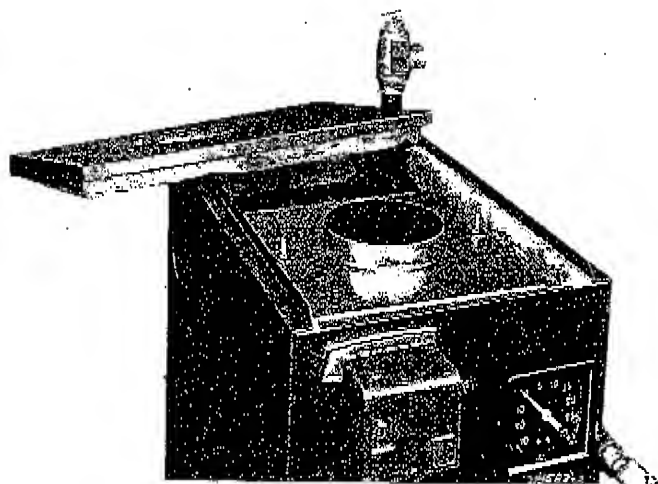
**Draining Boiler:** Do not drain boiler between heating season. In fact, the boiler should never be drained, flushed, or boiled out unless it is absolutely necessary. See special instructions for "blowing down" steam boilers on start-up when required.

**Leakage:** Make certain that there is no leakage in the system at any time.

**Flue Connections:** Inspect the flue connection to the chimney annually to make sure it is in good condition and has not become obstructed.

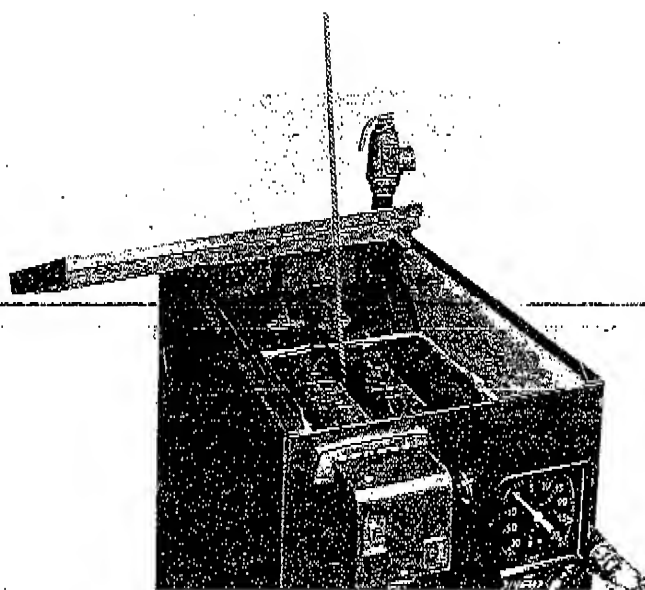
### CLEANING THE BOILER

1. Remove manifold enclosure and burner access door.
2. Remove burners and pilot.
3. Remove draft hood and vent pipe.
4. Loosen top panel and swing aside,
5. Remove flue collector.
6. Use flexible handled wire brush to clean passageways. Remove scrapings from bottom of boiler.
7. Reassemble.



A69084

Figure 17 - Swing Top Panel Aside



A66289

Figure 18 - Use of Flexible Handled Brush

## STEAM BOILER WIRING

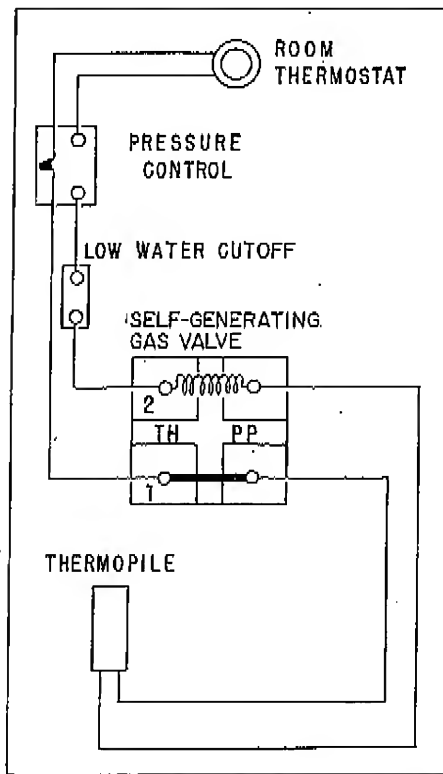


Figure 19

D-6 self-generating natural

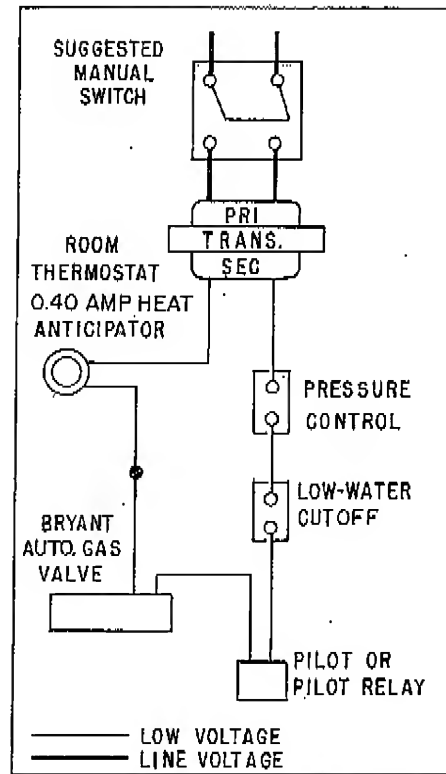


Figure 20

D4 non 100% shutoff, natural

D5 100% shutoff, natural

D2 100% shutoff, propane

## GW — WATER BOILER WIRING

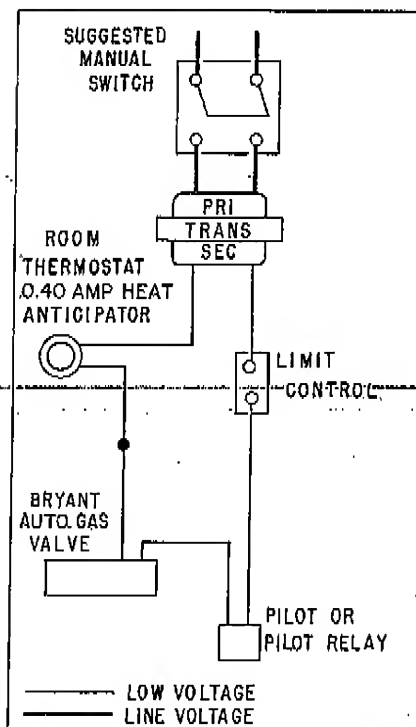


Figure 21

D5 nat, 100% shutoff  
 D4 nat, non 100% shutoff  
 Gravity circulation

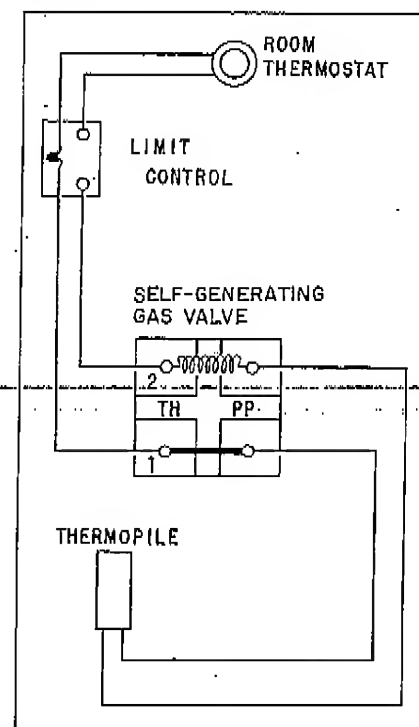


Figure 22

D6 nat, 100% shutoff  
 Self-generating  
 Gravity circulation

NOTE: If any of the original wire, as supplied, must be replaced, use same type or equivalent wire.

**PW — WATER BOILER WIRING**

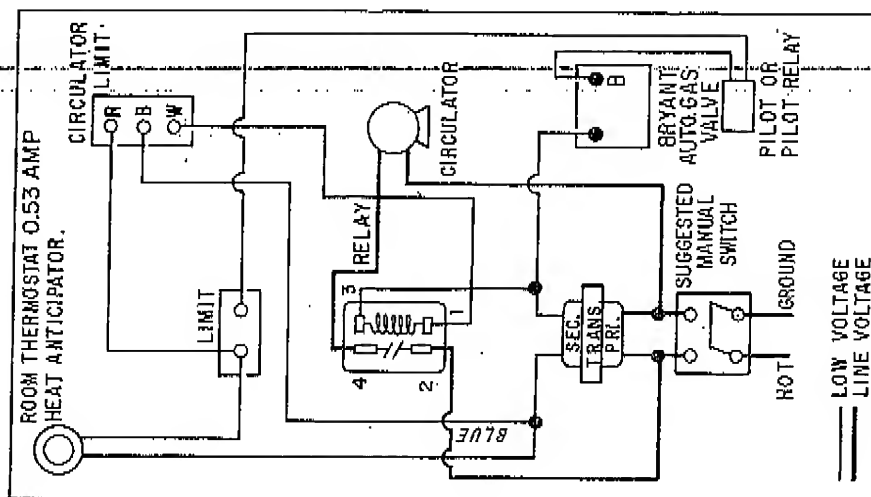
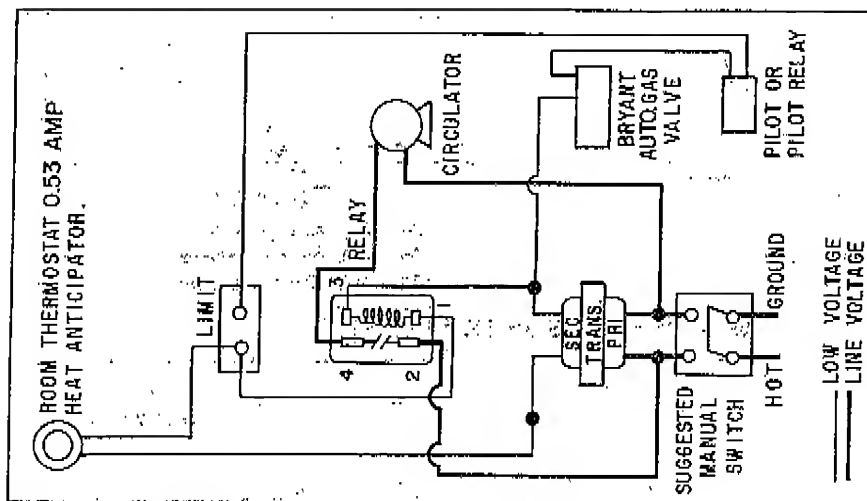


Figure 23

D4 nat, non 100% shutoff  
D5 nat, 100% shutoff

Forced circulation with water coil

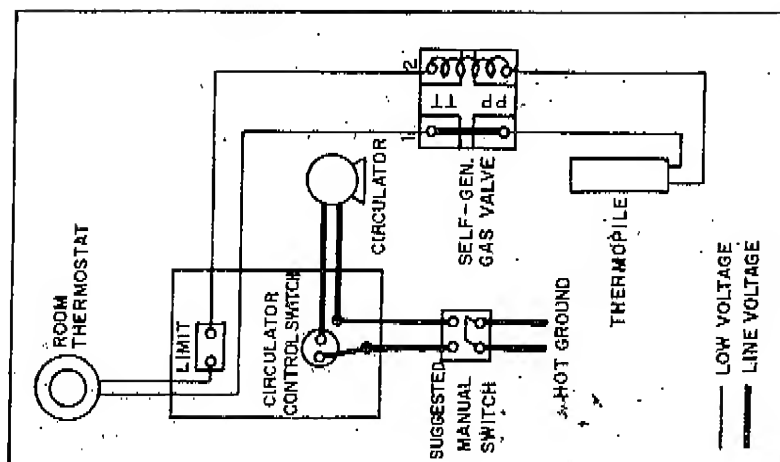
**NOTE:** If any of the original wire, as supplied, must be replaced, use same type or equivalent wire.



**Figure 24**

D2 propane, 100% shutoff  
D4 nat, non 100% shutoff  
D5 nat, 100% shutoff  
Forced circulation

### Forced circulation



**Figure 25**

**D6 Natural Gas Controls  
100% Shut-Off - Self Generating  
Forced Circulation Boiler**

**NOTE:** The circulator operates through a reverse acting low limit (makes on temperature rise). The low limit makes at approximately 110 to 120 degrees F and opens approximately 30 degrees F below the make temperature.